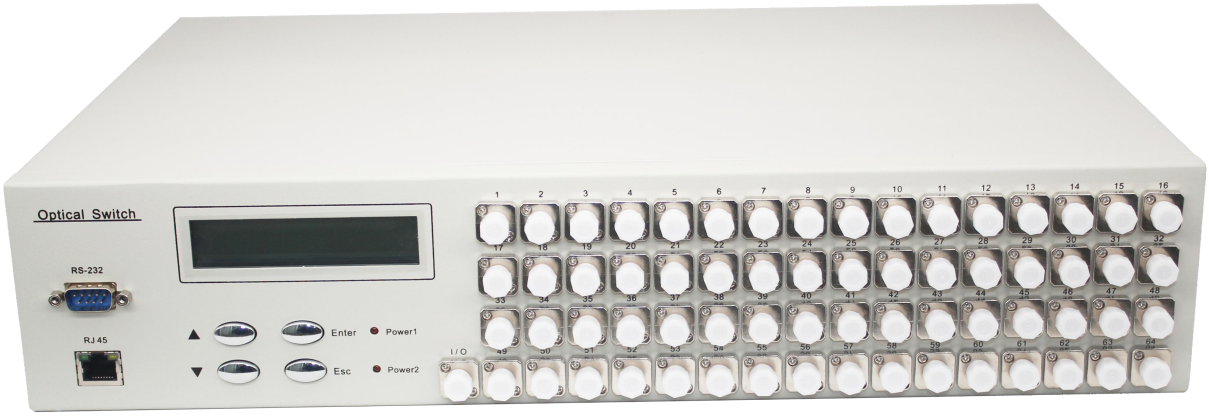
Rack-mounted 1×N Optical Switch



GUANZHOU RUID ELE-TECH CO., LTD.

Contents

1. Introduction

Optical switch is a kind of device, with the ability of optical route switch. In optic fiber transmission system, it is used for optical route controlling, LAN, light source / detector changing, and protecting the change of Ethernet etc. In optical fiber test system, it is used for optical fiber and optical fiber device testing, network testing, open-air optical cable testing and optical fiber sensing.

2. Features

a) Low insertion loss, switching time short, etc.

b) LCD display screen.

c) Automatic Scanning is available and the maximum interval time could be set as 99h 59m 59s, and the Start Channel and Terminal Channel of Scanning are settable.

3. Performances

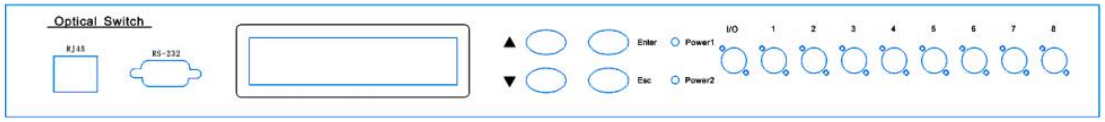
Parameters	Units	Norm			
Insertion Loss	dB	1<N≤12	16<N≤32	32<N≤64	64<N≤128
		Typ:0.8 Max:1.0	Typ:1.0 Max:1.2	Typ:1.4 Max:1.6	Typ:1.9 Max:2.2
Wavelength Range	nm	532~980 ； 1260~1650			
Test Wavelength	nm	650/780/850/980 ； 1310/1490/1550/1625/1650			
Return Loss	dB	SM≥50/MM≥30			
Crosstalk	dB	SM≥55/MM≥35			
PDL	dB	≤0.05			
WDL	dB	≤0.25			
TDL	dB	≤0.25			
Repeatability	dB	≤±0.02			
Durability	Cycles	10^7			
Output Transmit Power	mW	≤500			
Switching Time	ms	≤10（adjacent channel）			
Operating Temperature	℃	-20～+70			
Storage Temperature	℃	-40～+85			
Power Supply	V	AC 85-264V,50/60Hz or DC(36-72)V			
Dimensions	mm	1U W303×D439×H44 (≤16 channels) or customize			
		2U W303×D434×H89 (≤130 channels) or customize			

4. Operations

4.1. Structural Representation

4.1.1. Front Panel

Front Panel



（1）、RJ45-Port for Ethernet、RS-232-Serial Port: Port for Monitoring.

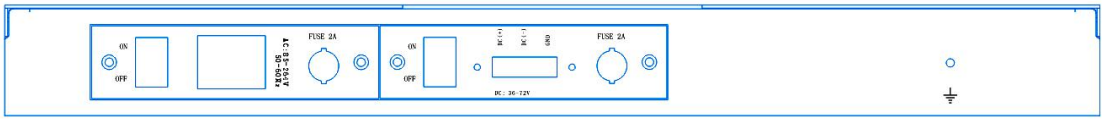
（2）、Optical Ports: COM input port，1, 2, 3,4 indicate individual part.

（3）、LCD-Display Screen: Exhibiting for the address of the equipment, current channel and related information.

（4）、▲——Up；▼——Down； Enter——Confirm；Esc——Cancel.

4.1.2. Rear Panel

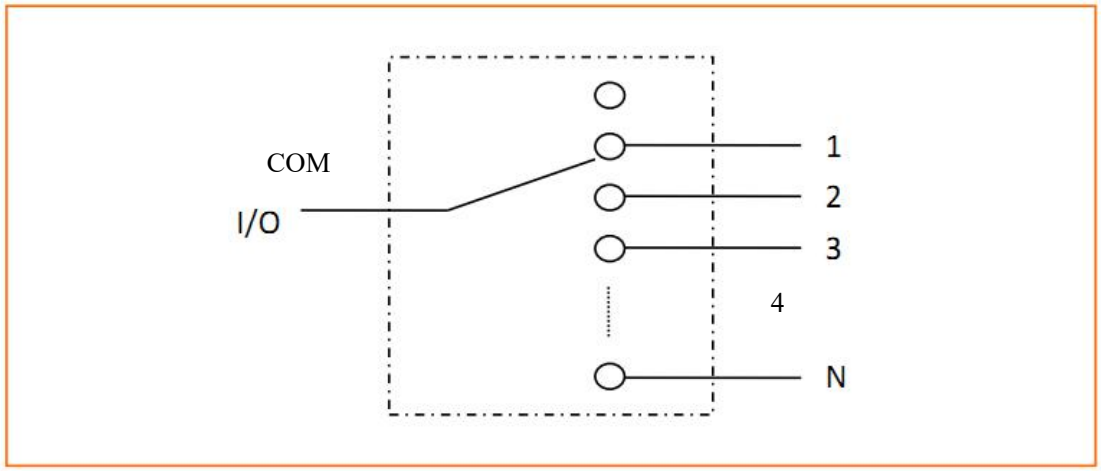
Rear Panel



（1）、Power：Indication for working power supply.

4.2. Attachment for Device

4.2.1. Internal Light Path Diagram



1×N Inner route connection

Diagram of Inner Beam Path for 1x4 Optical Fiber Switch

4.2.2. Communication Interface

（1）、RS-232

When connected to the computer, the DB9 serial port crosswire of both ends should be applied. It means that #2, #3 cable of both ends should be connected crossed, #5 cable should be abutting jointed, and the rest could be left out.

（2）、RJ45

When connected to the computer through switch, through lines should be applied. (The accurate order is 1-orange white, 2-orange, 3-green white, 4-blue, 5-blue white, 6-green, 7-brown white, 8-brown.)

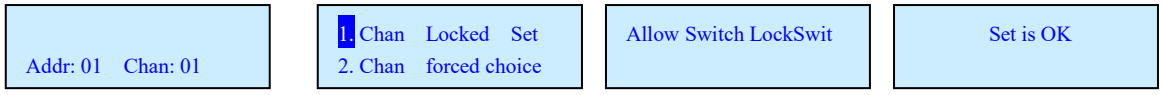
When connected to the computer directly, crosswire should be applied. (One end is 1-orange white, 2-orange, 3-green white, 4-blue, 5-blue white, 6-green, 7-brown white, 8-brown. Another end is 1-green white, 2-green, 3-orange white, 4-blue, 5-blue white, 6- orange, 7- brown white, 8-brown.)

4.3. Panel operation

（1）、Keys latching: send order through communication ports to set keys on panels, please refer to "communication agreement introduction". User can not set parameters on panels, when keys are latched.

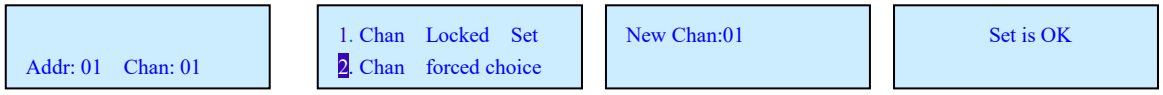
（2）、Chan Locked Set

- Press "enter" to login menu
- Press "▲"or "▼"to select "Chan Locked Set", press "enter" to enter
- Press "▲"or "▼"to select allow or lock switch, press "enter" to finish.
- Press "Esc" to back to previous step during the whole operation process.(Tips: when press "▲"or "▼", the switching will be act immediately.



（3）、Chan foced choice

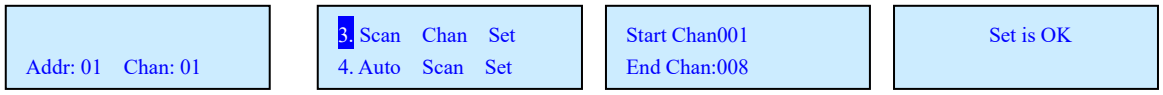
- Press "enter" to login menu
- Press "▲"or "▼"to select "Chan foced choice", press "enter" to enter
- Press "▲"or "▼"to set the new channel, press "enter" to finish.
- Press "Esc" to back to previous step during the whole operation process. (Tips: when press "▲"or "▼", the switching will be act immediately.



（4）、Scan Chan Set

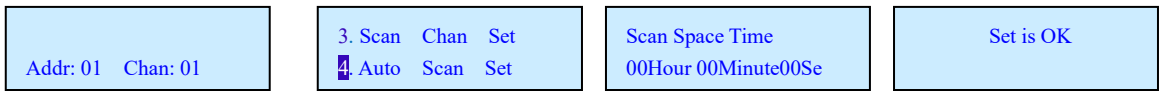
- Press "enter" to login menu
- Press "▲"or "▼"to select "Scan Chan Set", press "enter" to enter
- Press "▲"or "▼"to set the starting channel, press "enter" to finish.

- Press "▲"or "▼"to set the end channel, press "enter" to finish.
- Press "Esc" to back to previous step during the whole operation process. (Tips: when press "▲"or "▼", the switching will be act immediately.



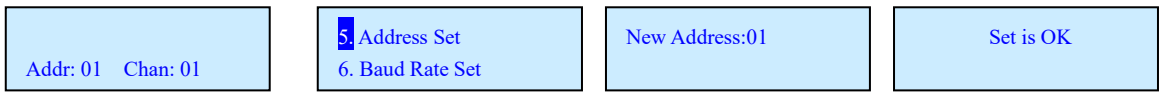
（5）、Auto Scan Set

- Press "enter" to login menu
- Press "▲"or "▼"to select "Auto Scan Set", press "enter" to enter
- Press "▲"or "▼"to set time of hour minute second, press "enter" to finish.
- Press "Esc" to back to previous step during the whole operation process. (Tips: when press "▲"or "▼", the switching will be act immediately.



（6）、Address Set

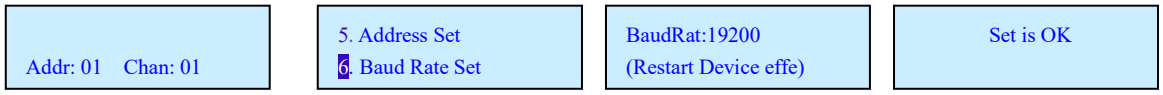
- Press "enter" to login menu
- Press "▲"or "▼"to select "Address Set", press "enter" to enter
- Press "▲"or "▼"to set the address of the device , press "enter" to finish.
- Press "Esc" to back to previous step during the whole operation process. (Tips: when press "▲"or "▼", the switching will be act immediately.



（7）、Baud Rate set

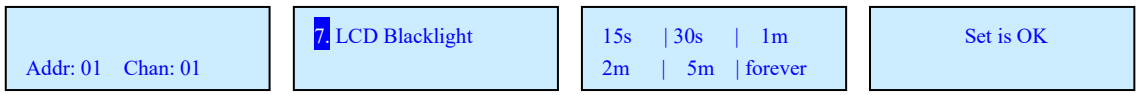
Optional baud: 1200, 2400, 4800, 9600, 19200, 57600, 115200, usual set is 19200. (please re-start to enforce baud set.)

- Press "enter" to enter menu
- Press "▲"or "▼"to select "Baud Rate Set", press "enter" to enter
- Press "▲"or "▼"to select baud rate, and press "enter" to enter
- Press "Esc" to back to previous step during the whole operation process



（8）、LCD Blacklight

- Press "enter" to enter menu
- Press "▲"or "▼"to select "LCD Backlight", press "enter" to enter
- Press "▲"or "▼"to select delayed time, and press "enter" to enter
- Press "Esc" to back to previous step during the whole operation process



4. 4. Programmed-controlled

The device can get controlling signal from PC through RS-232 (or RS-485)to realize the real-time monitoring (using the serial port or serial port monitoring system software); it can also remote monitoring via Ethernet port .

4. 4. 1. Program order

（1）This device can operate one command per time. It usually can enter the next command until the information return.

（2）Input any command only by capital letters, and "_"is underlining.

（3）In actual operation, the command input begins with"<"， and ends with">"

Program Order

Order	Describe	Sample
<ADXX_S_YY> Note: can stop automatically scan	Set the current channel(below 100) XX value: 00～99 (means the current address of the device） YY value：00～99（means switch to the next channel） Successful return: <ADXX_OK> Failure to return: <ADXX_E1>or<ADXX_E2>	<AD01_S_09> Means that switch of address 01 change to channel 09 If the total channel is above 9, Successful return: <AD01_OK> If the total channel is below 9, Failure to return: <AD01_E1>
<ADXX_C_YY> Note: can stop automatically scan	Set the current channel(below 100) XX value: 00～99 (means the current address of the device） YY value：00～99（means switch to the next channel） The instruction does not return any value!! We must caution the instruction, so as to avoid the misoperation of optical switch.	<AD01_C_09> Means that switch of address 01 change to channel 09 Note: no information is returned.
<ADXX_B_YYY_E_ZZZ>	Set autoscan channel XX value: 00～99（means the current address of the device） YYY value： 00～128（means the starting channel) ZZZ value：00～128（means the ending	<AD01_B_001_E_008> Means that the scanning channels are as follows: 1, 2, 3..... 8, 1 <AD01_B_008_E_002> Means that the scanning channels are as follows: 83..... N, 1，2，8

	channel) Successful return: <ADXX_OK> Failure to return: <ADXX_E1>or<ADXX_E2>	
<ADXX_B_E_?>	Query auto scan channel return：<ADXX_YYY_ZZZ> XX value: 00～99（means the current address of the device） YYY value： 00～128（(means the starting channel) ZZZ value：00～128（means the ending channel)	<AD01_B_E_?> return <AD01_004_008> Means the starting channel is 004, the end of the channel is 008
<ADXX_T_CHN?> Note: can stop automatically scan	Query the current channel Return: <ADXX_YY>（ the total channel is below 100） XX value: 00～99（means the current address of the device） YY value：00～99（(means the current channel) or return <ADXX_YYY>（the total channel is above 100）） XX value: 00～99（means the current address of the device） YYY value： 00～128（means the current channel)	<AD01_T_CHN?> If the current channel is 2 and the total channel is below 100）, Return: <AD01_02>; the total channel is above 100） return:<AD01_002>
<ADXX_M_STA?> Note: can stop automatically scan	query the current running state of optical switches Return: <ADXX_OK>(means normal operation) or return <ADXX_E1>(means data overflow) or return <ADXX_E2>(means that run the error)	<AD01_M_STA?> If the optical switch is operating normally and return <AD01_OK> If the optical switch is running the error and return <AD01_E2>

<ADXX_A_YY>	Set auto scan time interval and start up XX value: 00～99（means the current address of the device） YY value：00～99（(means scan interval time, the specific time is YY * 100ms, 00, the default is 100ms) Successful return: <ADXX_YY>(means the current channel) Description: this command returns an autoscan through the channel.	<AD01_A_10> If the current channel is 2 and the total channel is below 100）， Return <AD01_02>,time delay 1000ms If the current channel is 2 and the total channel is above 100）， Return <AD01_002>,time delay 1000ms
<ADXX_F_YY>	Set autoscan time interval and start up XX value: 00～99（means the current address of the device） YY value：00～99（(means scan interval time, the specific time is YY * 100ms, 00, the default is 100ms) Successful return: <ADXX_OK> Description: this command does not return to the auto scan channel.	<AD01_F_10> Successful return: <AD01_OK> Optical switch every 1000ms switch once, but no information is returned.
<ADXX_A_T_HH_MM_SS> Note: when the "HH_MM_SS" is "00_00_00", it can be stopped automatically.	Set auto scan time interval and start up XX value: 00～99（means the current address of the device） HH value：00～99（means the hours of time that represents the scan interval） MM value：00～59（means the minutes of time that represents the scan interval） SS value：00～59（means the seconds of time that represents the scan interval） Successful return: <ADXX_YY>（ means the current channel） Description: this command returns an auto scan through the channel. HH_MM_SS stop scanning for 00_00_00 (return: <ADXX_OK>)	<AD01_A_T_01_02_30> Optical switch every 01 hours 02 minutes 30 seconds to switch, If the current channel is 2 and the total channel is below 100）， Return <AD01_02>,time delay 1000ms If the current channel is 2 and the total channel is above 100）， Return <AD01_002>,time delay 1000ms

<ADXX_F_T_HH_MM_SS> Note: when the "HH_MM_SS" is "00_00_00", it can be stopped automatically.	Set auto scan time interval and start up XX value: 00～99（means the current address of the device） HH value：00～99（means the hours of time that represents the scan interval） MM value：00～59（means the minutes of time that represents the scan interval） SS value：00～59（means the seconds of time that represents the scan interval） Successful return: <ADXX_OK> Description: this command does not return to the autoscan channel. HH_MM_SS stop scanning for 00_00_00	<AD01_F_T_01_02_30> Successful return: <AD01_OK> Optical switch every 01 hours 02 minutes 30 seconds to switch, but no information is returned.
<ADXX_U_VALUE>	Set the baud rate of serial port XX value: 00～99（means the current address of the device） VALUE value： one of 1200、2400、4800、9600、19200、57600. Successful return: <ADXX_OK>	<AD01_U_9600> Means that the baud rate is set to 9600 <AD01_U_19200> Means that the baud rate is set to 19200
<ADXX_KEY_Y>	Set or query for the use of the device keys XX value: 00～99（means the current address of the device） Y value： 0 means prohibit to use,1 means allow to use Successful return: <ADXX_OK> or Y value：? means query Successful return: <ADXX_KEY_0> or <ADXX_KEY_1>	<AD01_KEY_1> Means that the key allow to use <AD01_KEY_0> Means that the key prohibit to use <AD01_KEY_?> If the key allow to use and return <AD01_KEY_1> If the key prohibit to use and return <AD01_KEY_0>
<ADXX_LOCK_Y>	Set or query the channel switching function of the device panel is provided	<AD01_LOCK_1> Means that on the panel to

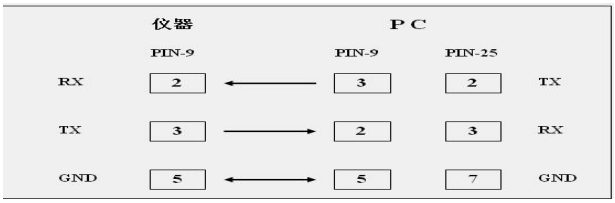
	XX value: 00～99（means the current address of the device） Y value： 1 means locking,0 means allowing Successful return: <ADXX_OK> or Y value：? means query Successful return: <ADXX_LOCK_0> or <ADXX_ LOCK_1>	prohibit switching channels； <AD01_LOCK_0> Means on the panel to allow switching channels； <AD01_LOCK_?> If the panel is forbidden to switch and return <AD01_LOCK_1> If the panel is allow to switch and return <AD01_LOCK_0>
<ADXX_G_YY>	Change device address XX value: 00～99（means the current address of the device） YY value: 00～99（means the new address of the device） Successful return: <ADYY_OK>	<AD01_G_03> Means that the change in the device address is 03 Successful return: <AD03_OK>
<ADXX_MAX_?>	Query the total number of channels for optical switch XX value: 00～99（means the new address of the device） Successful return: <ADYY_MAX_024>	Successful return: <AD01_MAX_024> Means the total number of channels for optical switch is 24

4. 4. 2. Serial ports connection and control

（1）、RS-232 pins definition and connection

① RS-232 pins definition: DB9 pins，#2-RXD, #3-TXD, #5-GND, other pins can not connect.

② RS-232 connect with equipment and PC:



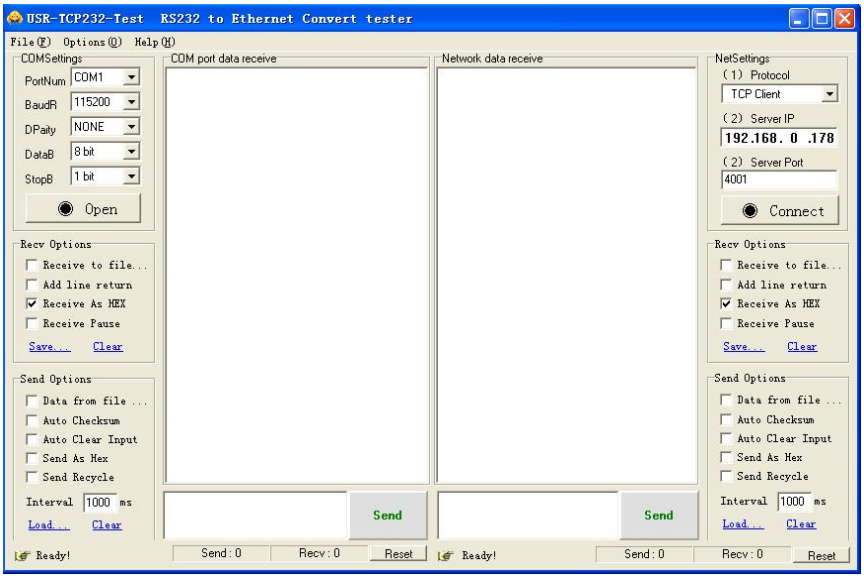
RS-232 connection

（2）、Serial ports set of PC

①、Serial ports set of PC: be same as the equipment serial ports set(19200 baud，8 data bit，1 stop bit，no parity check)

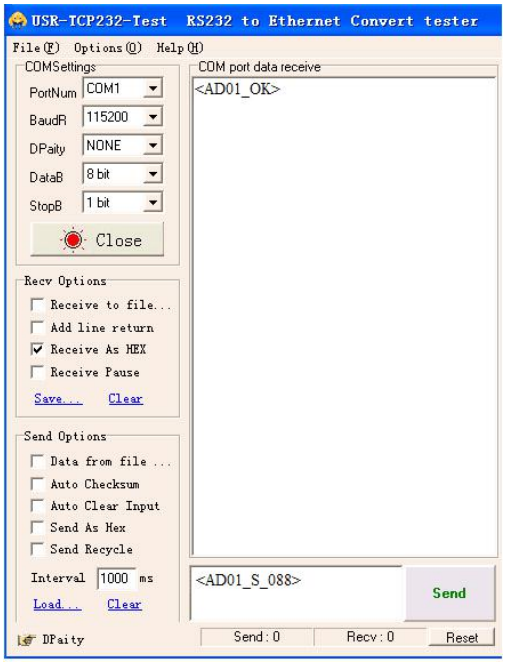
②、The software for debugging RS and Ethernet Port is USR-TCP232-Test, and it can be

downloaded at http://www.usr.cn/Download/27.html. The following shows the interface of USR-TCP232-Test, the left of interface can debug the RS Port and the right one can debug Ethernet Port.



USR-TCP232-Test interface

（3）After Ethernet connecting well between device and upper computer, send control order by USR-TCP232-Test, device would return related data to monitor the related status of device.



Serial port debug interface

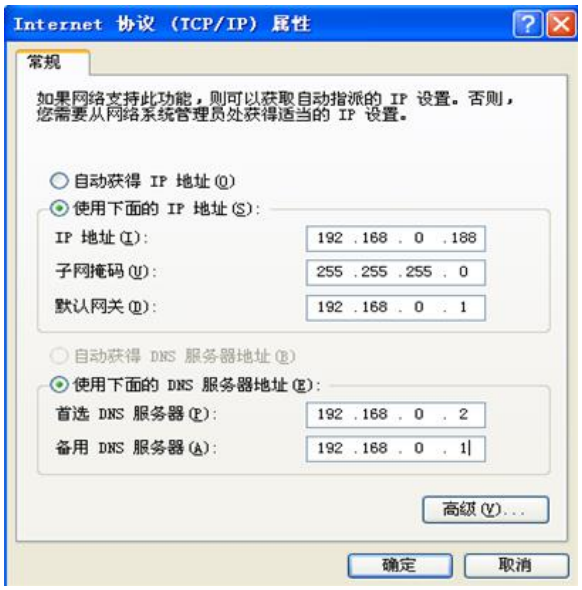
4. 4. 3. Internet port monitor

To utilize the RJ-45 to monitor the device, it must make the PC IP address in the same net segment as our device. The following steps are in detail.

(TCP testing software http://embedcontrol.com/products/Ethernet_tools/test_tool.asp)

（1）、IP set

Set IP: 192.168.0.188, subnet mask: 255.255.255.0, default gateway:192.168.0.1, DNS can be blank. (Attention: set IP should be in the same internet segment with equipment). As the following picture:



Change PC IP

（2）、Equipment configuration in WEB

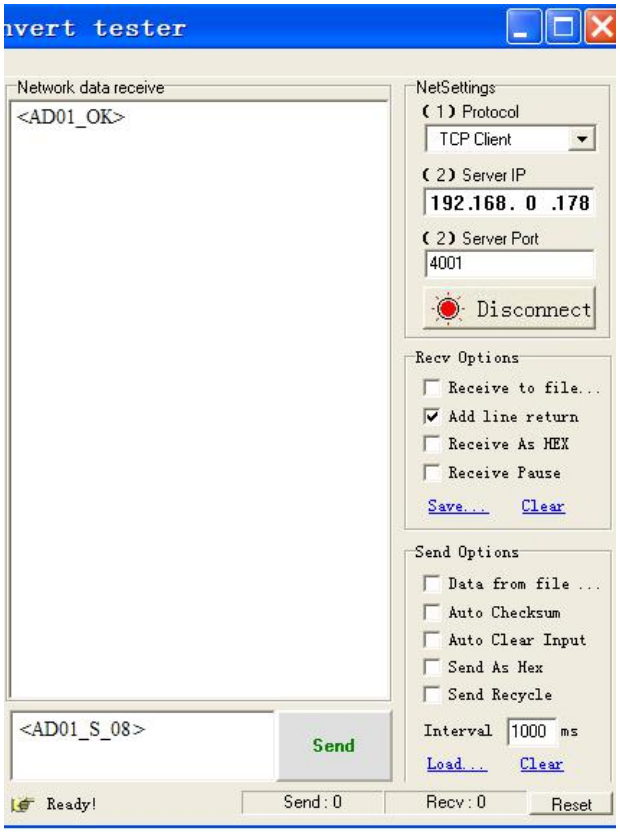
①、login configuration system

Firstly to open the web browser and key in the former IP (http://192.168.0.178), then click Enter. And you will see the following interface, to type in the password ("88888"as default) in 【Password】, then "Login" to enter the setting interface.

②、Change the IP address

Click "system info" can login the setting interface, and then to key in the IP as 192.168.2.11, Subnet Mask： 255.255.255.0, default gateway： 192.168.2.1, and others are no need to change. After that to click Apply, then all are settle down. Click "reset device" to make in effect of all the settings.

（5） After Ethernet connecting well between device and upper computer, send control order by USR-TCP232-Test, device would return related data to monitor the related status of device.



Internet port debug interface

5. Announcements and maintenances

5. 1. Announcements

a) Connect each port with the right optical line, when use this equipment.

b) Ground connection and power supply should be in the required range.

c) Power off to settle when there is a problem of equipment.

d) Do connect ports correctly, or test results and insertion loss will not correct.

e) Slight shake or noises is normal when switching optical channel.

5. 2. Maintenances

a) Avoid strong mechanical vibration, crash, falling and other mechanical damage. Make sure equipments with good package, vibration isolation, rain-proof and waterproof during transportation.

b) Keep equipments clean and operation environment without corrosive gas. Use clean towel with water or soap to clean equipment case and panel, do not use alcohol.

c) Do coat the dust cap to avoid optical end face damaged, when remove optical fiber connection cable.

5.3 If there is any question else, please fell free to contact our company, we will very appreciate

to get suggestions from you.

6. Usual Faults

Faults	Possible reason	Solutions
no display when power on	bad power connection	Re-connect the power well, and power on.
high insertion loss	dirty with the connector face	Re-clean the connector face and fix it well. Check the connector damage or not.
Optical line can't switch on the panel	the keys on panel locked	Send program order to permit keys operation.
Upper computer order non-effective	inconformity of baud rate set	Set baud rate in the menu as your requirements.
	Bad connection of internet line and serial port line.	Power off first , re-check internet line and serial port line, and then power on.

7. Factory default configuration

The factory default configuration list

Items	Default settings	Note
Keyboard	On	
Chan Locked Set	allow	
Scan Chan	1 ～ N	
Address	01	
Baud rate	19200	8 data bits, one stop bit,and none parity bit
LCD Blacklight	1 minute	
IP	192.168.0.178	Protocol：TCP Server ； Port：4001